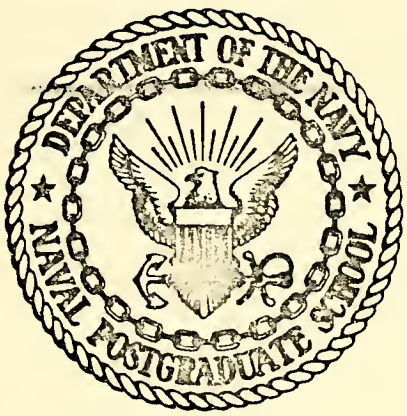
LOCKHEED AIRCRAFT CORPORATION CASE STUDIES

Kent A. Link

NAVAL POSTGRADUATE SCHOOL
Monterey, California



THESIS

LOCKHEED AIRCRAFT CORPORATION

CASE STUDIES

by

Kent "A" Link

June 1974

Thesis Advisor: Leslie Darbyshire

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER	2. GOVT ACCESSION NO.	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) Lockheed Aircraft Corporation Case Studies		5. TYPE OF REPORT & PERIOD COVERED Master's Thesis; June 1974 6. PERFORMING ORG. REPORT NUMBER
7. AUTHOR(s) Kent "A" Link		8. CONTRACT OR GRANT NUMBER(s)
9. PERFORMING ORGANIZATION NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS
11. CONTROLLING OFFICE NAME AND ADDRESS Naval Postgraduate School Monterey, California 93940		12. REPORT DATE June 1974 13. NUMBER OF PAGES
14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)		15. SECURITY CLASS. (of this report) 15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; distribution unlimited.

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

Lockheed Aircraft Corporation was a financially sound organization during the mid 1960s with a reputation as a leader in the aerospace industry. Long term debt for the corporation amounted to only $17 million in 1966 and was supported by stockholders' equity of $318 million. Lockheed incurred substantial losses in 1969 and 1970 on four major defense contracts. The company was also having financial difficulty with their latest commercial venture. In 1971 the company claimed that it faced bankruptcy unless the

government would provide loan guarantees in order to enable them to obtain additional capital. By the end of 1972, long term debt was over $760 million with stockholders' equity of $266 million.

This thesis consists of case studies which trace the decline of Lockheed through 1972. Major projects which contributed to the decline, such as the C-5A, the Cheyenne helicopter and the L-1011 TriStar, are highlighted. All cases were prepared from published materials.

Lockheed Aircraft Corporation

Case Studies

by

Kent "A" Link
Lieutenant Commander, United States Navy
B.S., United States Naval Academy, 1959

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
June 1974

ABSTRACT

Lockheed Aircraft Corporation was a financially sound organization during the mid 1960s with a reputation as a leader in the aerospace industry. Long term debt for the corporation amounted to only $17 million in 1966 and was supported by stockholders' equity of $318 million. Lockheed incurred substantial losses in 1969 and 1970 on four major defense contracts. The company was also have financial difficulty with their latest commercial venture. In 1971 the company claimed that it faced bankruptcy unless the government would provide loan guarantees in order to enable them to obtain additional capital. By the end of 1972, long term debt was over $760 million with stockholders' equity of $266 million.

This thesis consists of case studies which trace the decline of Lockheed through 1972. Major projects which contributed to the decline, such as the C-5A, the Cheyenne helicopter and the L-1011 TriStar, are highlighted. All cases were prepared from published materials.

TABLE OF CONTENTS

I. INTRODUCTION

In May 1971 legislation which became known as the Emergency Loan Guarantee Act was introduced before Congress. The avowed purpose of this legislation was to provide Federal guarantees for loans to major U. S. corporations have serious financial difficulties. It was widely believed to be specifically aimed toward rescuing the nation's number one defense contractor, Lockheed Aircraft Corporation, from bankruptcy. Published information on the operations of Lockheed over the past decade provides an abundance of material. This information traces the decline of this giant aerospace corporation from the position of an industry leader in the mid 1960s to near bankruptcy in the early 1970s.

This thesis consists of a series of case studies centered around Lockheed's involvement in defense contracts awarded to the company under the concept known as "total package procurement." The cases also include Lockheed's latest entry into the commercial transport field, the L-1011, and outline the financial decline of the company from 1964 to the end of 1974. These cases are the result of an interest by Professor Leslie Darbyshire in developing material for use in the Financial Management courses at the Naval Postgraduate School. Professor Darbyshire spent several months researching available published sources on the past operations of Lockheed. In December 1973, the author accepted Professor Darbyshire's offer to sponsor development of the Lockheed cases as a thesis project. Additional

research was conducted to extend the coverage of the available material and to provide information on events which, although external to Lockheed, impacted upon company operations.

All information contained in these cases has been prepared from publicly available sources. Specific references to footnotes have been eliminated to facilitate classroom use of the cases.

II. LOCKHEED AIRCRAFT CORPORATION: TPP CASE

A. BACKGROUND

During the spring of 1965, three leading corporations in the aerospace industry were busily engaged in preparing bids for submission on a multibillion dollar defense project. This project was the development, production and partial support of the Air Force C-5A heavy logistic transport. The winner of the contract to build the world's largest aircraft could expect, in addition to contractual profits or losses, to gain a substantial edge in the future air-transport business. The three competitors for the airframe contract, Lockheed, Douglas and Boeing, were each subsidized by the Air Force with $6 million to aid in preparing their submissions. With the possibility of profits ranging in the $200 million area, each company had invested approximately $20 million of its own capital.

The bids were submitted in April to the Source Selection Board consisting of four Air Force generals with a staff of over five hundred specialists. After intensive review, there was a major split in opinions regarding the Lockheed and Boeing submissions. The Source Selection Board favored the superior performance of the Boeing proposal while higher authority was attracted by the significantly lower price offered by Lockheed. The Douglas submission had been ruled out on both counts. The Lockheed proposal had underbid Boeing by $300 million and, in the end, the dollar prevailed. In October, Lockheed was awarded the contract. According to Thomas R. May,

Lockheed-Georgia vice president and C-5A program manager,

> The learning experience on the C-130 and C-141 has been projected forward. We did a good job on the C-130 and a better job on the C-141. We are continuing the improvement curve on the C-5A. We really didn't price on what we've done in the past, but on what we intend to do in the future....The learning curve did put us in a relatively good position....We (also) wanted this program pretty badly and we sharpened our pencil pretty well.

Lockheed was optimistic about the future of the C-5A and estimated the total market potential at 300 aircraft, 100 of which would be a civilian version.

B. THE C-5A CONTRACT

The C-5A contract was unique. It was the first contract awarded under the "total package procurement" concept, known as TPP. TPP was introduced by Defense Secretary Robert S. McNamara in an effort to reduce defense spending. It was intended primarily for state-of-the-art projects that would not require a breakthrough in technology. Prior to this time, most defense contracts were let in two stages. A research/development/prototype contract was awarded first and the production contract, second. The winner of the R&D contract was almost virtually assured of the follow-on contract because of technical expertise acquired during development. This encouraged the practice of "buying-in," that is, bidding low on a fixed price R&D contract while planning to recoup any losses incurred on it during the subsequent production phase. TPP was designed to discourage this practice and was to replace many cost-plus programs, where the incentive to hold down costs was lacking.

Under TPP, a contractor was required to submit a fixed price bid to cover the entire program. In the case of the C-5A, this was

for a period of eight years. The contractor was to be held responsible for all system specification, performance and milestones, such as first test flight and delivery dates. The fixed contract price for the C-5A contained a target cost plus a profit of 10%. In addition, a ceiling price was set at approximately 130% of the target cost. The ceiling price was the maximum amount, after adjustments for economic fluctuations, that the government was obligated to spend on the entire program. Exhibit 1 contains a simplified breakdown of the Lockheed submission.

EXHIBIT 1
C-5A Target Costs, Profits, Target and Ceiling Prices
($ In Millions)

	Target Cost	Target Profit	Target Price	Ceiling Price
R&D + Run "A"	$1,280	$128	$1,408	$1,664
Run "B"	494	49	543	642
Total	$1,774	$177	$1,951	$2,306

C. CONTRACT PROVISIONS

The program was divided into two major sections. First, Production Run A required the company to develop and evaluate five test platforms. These five aircraft would later be reconfigured to Air Force specifications for operational use. An additional 53 aircraft were included in Run A. Production Run B was an option for 57 aircraft that could be ordered at the discretion of the Air Force, subject to congressional funding. This option, if desired, was to be exercised two years prior to the first scheduled delivery date.

The C-5A contract contained a controversial provision known as the "repricing formula" by those who defended it and as the "golden handshake" by critics. (The repricing formula, options and other adjustments were offered in identical form to all competitors.) The formula would come into effect only if the option for Production Run B was exercised. To become fully effective, the Air Force needed to purchase at least 32 of the 57 Run B aircraft. Any lesser amount would significantly blunt the impact of the repricing formula. In the event of cost overruns and if the option for Run B was not exercised, Lockheed was to pay 30% of costs exceeding the target cost up to the ceiling price. Lockheed's share of the cost overruns was to be deducted from the Run A target profit of $128 million. Any costs in excess of the ceiling price would be paid for by Lockheed. If Run B was ordered, and cost overruns on Run A exceeded 140% of the Run A target cost, the repricing formula came into effect.

> The repricing formula for Run B was worked out on a computer and virtually requires a computer to understand. If actual, audited costs of Run A exceed 140.5 percent of the Run A target costs, the excess percentage over 130 percent will be multiplied by two. The resulting percentage figure will be used to multiply the target cost and ceiling price of Run B as established in the original contract.

The resultant product would then be added to the original target cost and ceiling price to set new amounts for Run B. Critics of the formula estimated that, if a contractor was sure that Run B would be ordered, it would be possible to run up astronomical losses during Run A and end up with a net profit through the repricing of Run B.

D. C-5A PROBLEM AREAS

Lockheed's problems commenced early in the development phase. Several major technical changes had been inserted in the contract proposal at the last minute. The company underestimated the costs of the changes and the amount of time required for redesign work. The biggest change had been an increase in the size of the wing area in order to meet runway criteria imposed by the Air Force. Increasing the wing area significantly increased aircraft weight and resulted in more rounds of design work. Costs began rising. In an effort to obtain relief, the company requested the C-5A System Program Office (SPO) to make a trade-off between aircraft weight and engine power. This request would have required General Electric, the prime engine contractor, to increase engine performance at governmental expense. The SPO refused. Lockheed was forced to go to exotic and expensive metals, such as titanium and beryllium, in the effort to minimize weight.

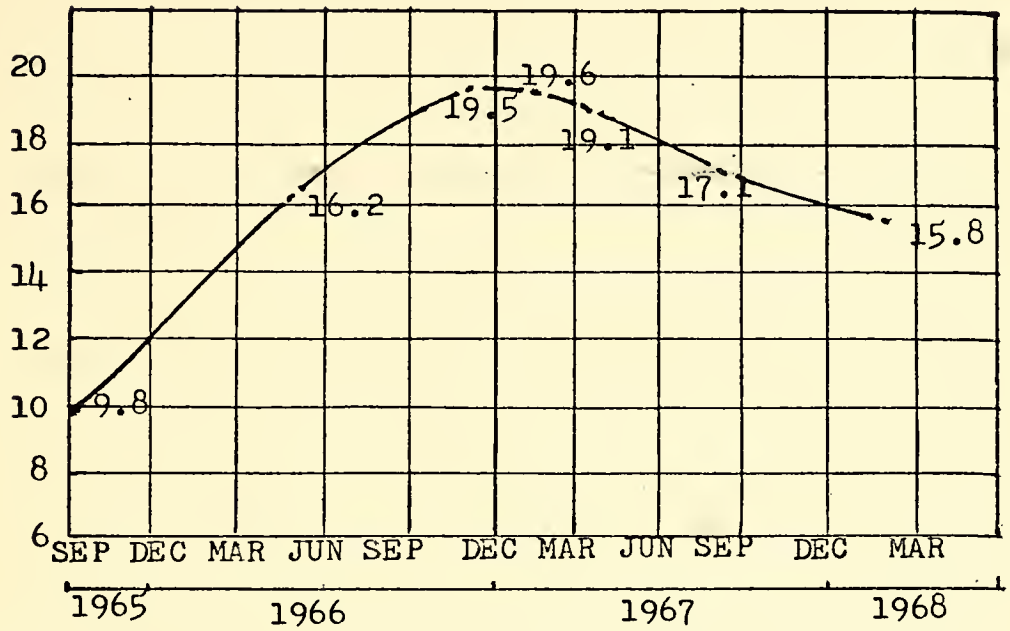
The company's initial concept of the C-5A was a scaled-up version of the C-141. This proved not to be the case, however, as the sheer physical size of the giant aircraft created many complex problems that were expensive to correct. Costs continued to increase and, by the end of 1966, many key items in the development phase had been overrun by more than 100%

Lockheed moved into production in 1967 with many technical problems unresolved. The lead time required to obtain basic materials and components had averaged ten weeks when the contract was awarded. During the production phase, the same items required

from 16-20 weeks of lead time. (See Exhibit 2.) The increase in

EXHIBIT 2

Changes In Lead Time



lead time resulted from two basic causes. First was the rapid escalation of the Vietnam conflict, with the concurrent requirement for military equipment. The second was the dramatic increase in the demand for commercial aircraft during 1964-1967. The 1964 value of backlog orders in the aerospace industry was $8 billion, with the military accounting for almost 70% of the total. By 1967 the backlog amounted to $21 billion, with the military share at 40%. Again Lockheed contacted the SPO in an effort to have milestone dates relaxed. Under the terms of the contract, the company could be assessed up to $11 million for late deliveries. Again the SPO stood firm. To obtain critical lead time items, the company had to pay premium prices and resorted to excessive overtime to keep the aircraft

on schedule. Prior to the era of TPP, "contract nourishment" had been a common practice in defense contracting. Under this practice, contract specifications were often relaxed or enough contract change orders were issued to ensure that the contractor did not fare badly. Never before had the terms of a contract been so rigidly enforced. In their 1969 report to stockholders the company noted that,

> Contract terms were regarded as sacrosant even though a relaxation of specifications and delivery dates could have greatly lessened costs.

The inflexibility of the SPO was not Lockheed's only problem. In preparing their submissions, all contractors had been warned to carefully consider the consequences of economic trends for the first two years of the contract. On 1 January 1968 an economic fluctuation clause was to become effective. This clause was designed to protect the contractor in the event of abnormal inflation and the government in case of a recession. The clause included no provision for increasing or decreasing profits. In essence the clause provided for normalcy bands centered on straight line projections of four cost indexes. Lacking any insight into the future, both Lockheed and the government assumed that the trends exhibited during the base period, 1960-1964, would continue and be within the normalcy band in 1968. Almost immediately after Lockheed was awarded the contract, the country entered a period of abnormal inflation. The cost indexes began rising at twice the rate exhibited during the base period. Exhibits 3 through 6 show the normalcy bands, the actual trends through June 1969 and the Lockheed Projections through 1973. In 1969, Lockheed estimated that the total cost increase due to abnormal inflation would

amount to $627 million. Of that amount, Lockheed could expect a

EXHIBIT 3

Labor Cost Index

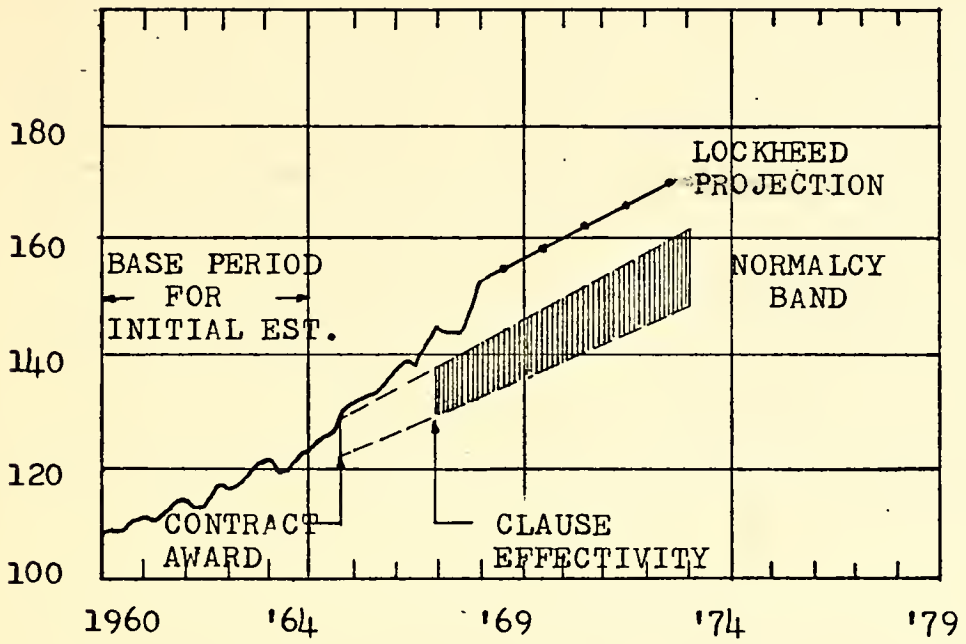


EXHIBIT 4

Material cost Index

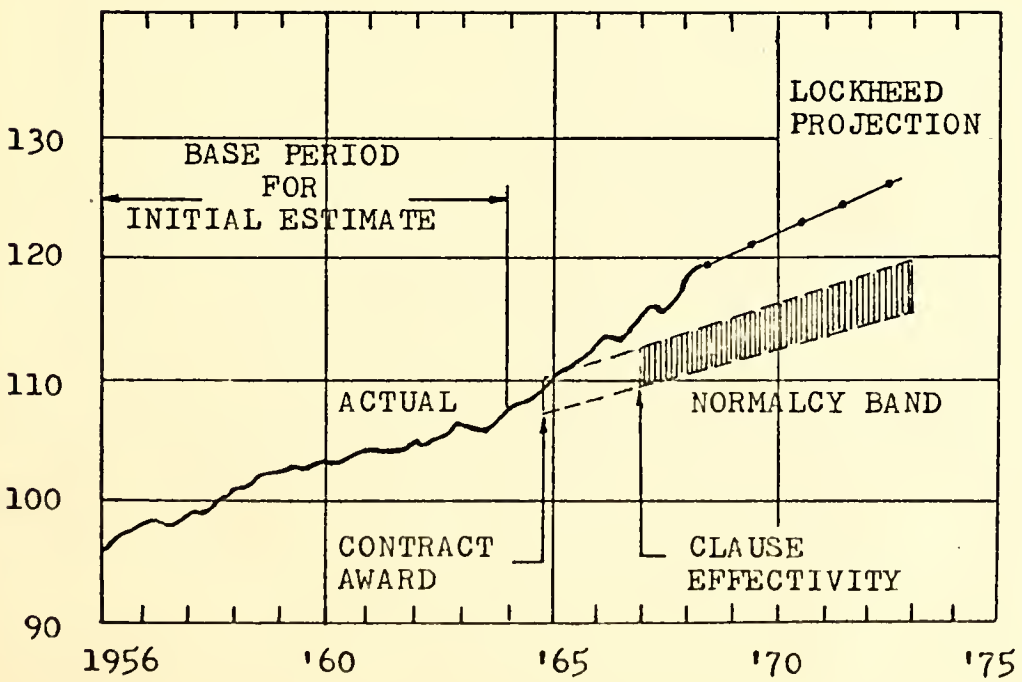


EXHIBIT 5

Subcontract Cost Index

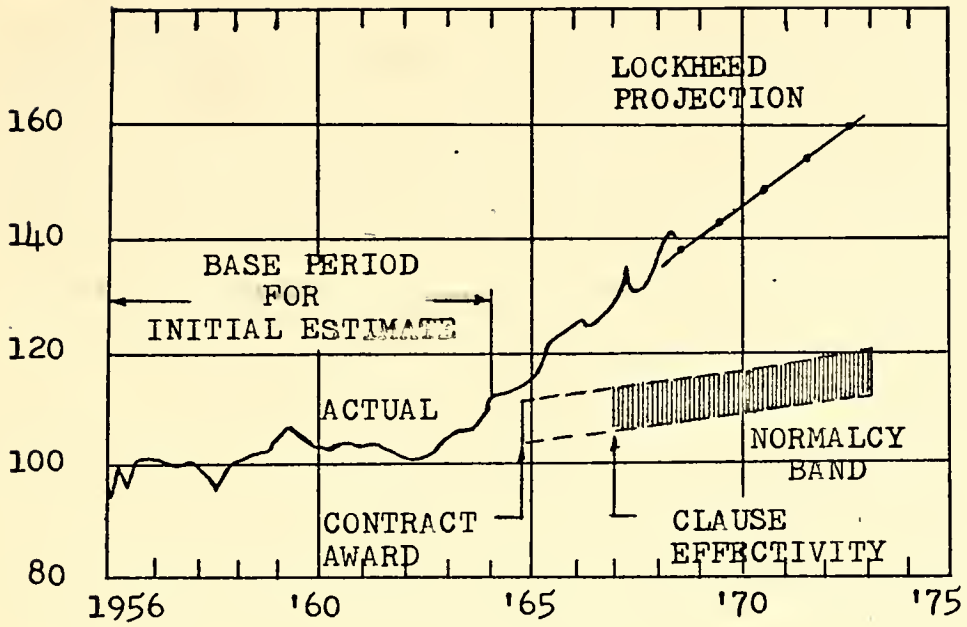
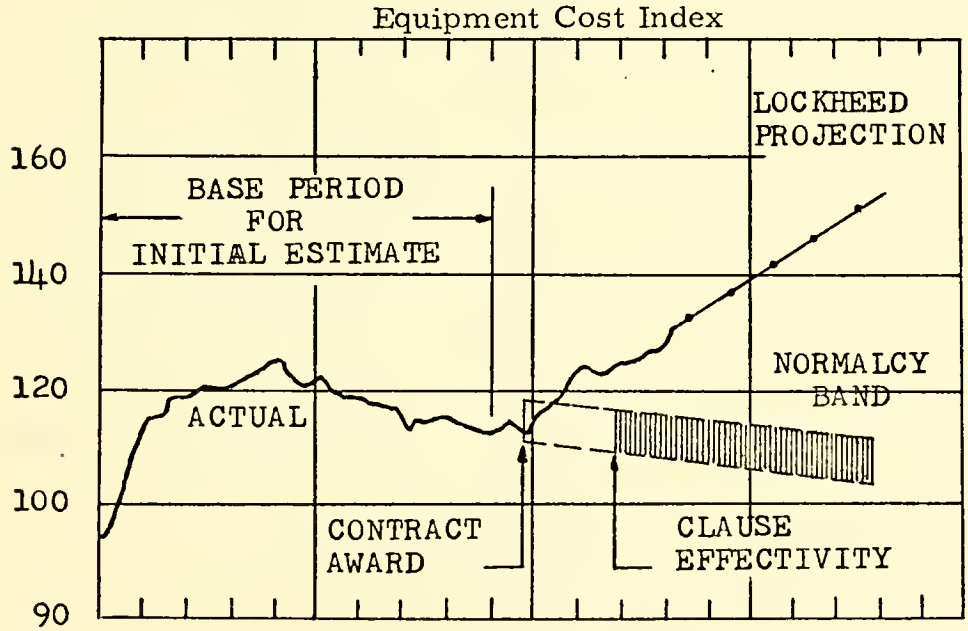


EXHIBIT 6

Equipment Cost Index



target cost and ceiling price adjustment of only $171 million due to the clause's effective date and the Air Force interpretation of contract wording.

Adding to Lockheed's troubles was alledged inefficiency on the production line. One supervisor noted that,

> He had 40 more men in his department than he needed; that he was getting about six hours work out of eight hours; that when he went to ten hours and over, the production dropped to five hours. He knew personally of two cases where the individual was making ten dollars an hour, did not have a degree, was not doing anything, and yet spent sixty hours a week doing it because that was what the contract called for. This can be multiplied by many hundreds of times.

Although it was known that the company was facing cost overruns on the C-5A program, the magnitude of the overruns was not general knowledge. Early in 1968 the SPO became aware that costs were approximately $1 billion above the target cost of $1.28 billion. The SPO did not make this information available because of "security considerations." Knowing that the company was facing a large monetary loss, the SPO feared that public disclosure could have an adverse effect on the stock market and Lockheed's liquidity position. In the meantime, Lockheed was presenting a low profile on the cost situation. With the Air Force due to exercise the Run B option early in 1969, the company was not anxious to reveal the true cost picture. In November however, A. E. Fitzgerald, a deputy assistant secretary of the Air Force, appeared before a congressional hearing. His testimony indicated that cost overruns for Run A would reach at least 100%. Despite unfavorable publicity and political pressures, the Air Force exercised the option for Production Run B in January 1969. In November of the same year, the option for Run B was unilaterally amended by the Air Force to place a final order for 23 aircraft due to "budgetary constraints."

E. THE CHEYENNE HELICOPTER PROGRAM

The contract for the AH-56A Cheyenne helicopter was the second defense contract awarded under TPP. A new concept in helicopters, the rigid-rotor, was to be incorporated into the Cheyenne development. The rigid-rotor was designed to eliminate stability problems inherent to hovering aircraft and was to provide the Cheyenne with a top airspeed twice that of conventional helicopters. During the late fifties and early sixties Lockheed had developed, with their own capital, a small rigid-rotor system. It had been installed in a small helicopter and had been certified by the Federal Aviation Administration. This technological edge was largely responsible for Lockheed being awarded the Cheyenne contract in March 1966 over established helicopter companies. Lockheed had also submitted the lowest bid. The contract called for the development and testing of 10 prototype aircraft. Production options were attached to the contract, setting fixed prices for 375, 500, 1,000, and 1,500 planes. If the production option was not exercised by the Army prior to the end of 1967, the contract would expire and the fixed prices renegotiated.

Lockheed was beginning to experience the technology problems related to scaling up the C-5A from a smaller aircraft at the same time as the contract negotiations for the Cheyenne. In spite of these difficulties Lockheed was confident that similar problems would not occur with the Cheyenne. Lockheed was so optimistic that they negotiated a ceiling price for the program of only 115% of the target cost. The comparable figure was 130% for the C-5A.

The Cheyenne program encountered the same basic difficulties as the C-5A. Increased lead times required the company to pay premium prices to keep the aircraft on schedule. The rigid-rotor did not work as predicted and required expensive redesign work. By the end of 1967, development costs had exceeded the ceiling price of $96 million by over $50 million. This excess had come out of Lockheed's pocket, as the Army would only authorize progress payments up to the ceiling price. The Army was late in exercising the production run option. Despite the problems encountered and rising costs, the Army issued a letter of intent in January 1968 for the production of 375 aircraft. The production contract, for almost $875 million, was double the original cost estimates. It was aircraft performance however, not cost, that led to the demise of the Cheyenne.

The program moved into development with technical problems unresolved and the development effort continuing. As time passed, the main problems that eluded correction were instability at high speeds, a cruise speed 10 miles per hour below contract specifications, handling characteristics during sidewise flight and rotor oscillations that led to a crash and the death of the test pilot.

Lockheed made several tactical errors in dealing with the Army. In gaining permission to build the Cheyenne, the Army had won an unusual victory over the Air Force. Close ground support, the primary mission of the Cheyenne, fell under the auspices of the Air Force, Lockheed assumed that the Army would take no action that would jeopardize their parochial victory. The Army was unfamiliar

with the aerospace industry. They were concerned with Lockheed's handling of the technical problems and the increasing publicity centered on cost overruns. The company did not make a concerted effort to convince the Army that these difficulties were normal in a new weapons system. In March 1969 the crash caused by rotor vibrations occurred. The Army had had enough and issued a public "cure notice" to Lockheed in April. This notice listed all discrepancies of the program and gave the company less than three weeks to come up with a formal correction to each problem. Lockheed responded to the cure notice with an around-the-clock effort. Within the time alloted, the company was able to prepare an answer for the Army. This answer listed in detail exactly how the company planned to correct each problem. The Army was still not convinced that the Cheyenne could be built to specifications on schedule. The Army notified Lockheed, by way of a press release, that the contract was being terminated for default. Lockheed officials were amazed. Said Daniel Haughton:

> If they wanted to terminate, they should have terminated for convenience, not default. My goodness! You don't make quantum jumps in technology without encountering problems.

Lockheed had expended $98 million on Cheyenne production while receiving $54 million in progress payments. Under termination for default, Lockheed would be required to refund all progress payments. A termination for the government's convenience would allow the company to recoup all production and termination expenses. Lockheed submitted the issue to the Armed Services Board of Contract Appeals for arabitration. Lockheed insisted that the Cheyenne had met 90% of the contract specifications and, therefore, the contract could not be terminated for default.

F. THE SRAM PROGRAM

The SRAM propulsion unit was Lockheed's third and last involvement under TPP. Although the SRAM contract was the smallest of the three TPP programs, it was to present the most complex challenge in terms of technology. Ten days before contract proposals were to be submitted, the Air Force increased SRAM performance specifications by 30%. With true Lockheed optimism, the company responded to the challenge. The company prepared new designs in which it made many assumptions. Lockheed did not have the time required to test and evaluate their proposals adequately and informed the Air Force of this fact.

In November 1966, Lockheed was awarded the SRAM motor contract, worth $17 million, with their proposed design on paper only. The theories that Lockheed had hastily prepared did not prove workable. Redesign work and the development of a propellant capable of meeting Air Force specifications escalated the cost rapidly. Although all of the problems were eventually solved, the Air Force did not exercise the production option because of other defects in the rocket assembly. By the end of 1969, costs had exceeded the ceiling price by $30 million and were still rising. The company submitted a claim in excess of $50 million to the Air Force. Justification of the claim was based on the premise that the SRAM motor was not a state-of-the-air project and, therefore, should not have been funded under the TPP concept.

G. THE SHIP CONSTRUCTION PROGRAM

The Navy shipbuilding programs were not TPP contracts. The program consisted of nine separate contracts awarded to Lockheed throughout the 1960s. Each of the contracts had experienced cost overruns due to Navy-initiated changes, work stoppages and other unforeseen difficulties. By the end of 1969 Lockheed had submitted claims to the government totaling $175 million on the various ship contracts. In reporting the status of these claims to the stockholders in early 1970, Mr. Haughton noted:

> The bulk of the U. S. shipbuilding industry has encountered comparable grave troubles on similar Navy ship construction, as indicated by more than a billion dollars in contract claims. This suggests that the procurement system, rather than solely individual deficiencies, has been a major contributor to this problem.

H. CONCLUSION

Lockheed moved into 1970 in poor financial health. Adding to the military problems were funding difficulties for their L-1011 air bus. The L-1011 was a Lockheed venture to recapture a portion of the civilian business of the aerospace industry. In 1969 the company obtained an unsecured line of credit from a banking consortium for $400 million. By early 1970 the line of credit, intended to finance the L-1011, had been drawn down by $320 million. Of that amount, $170 million had been diverted from the L-1011 program to fund the foundering military programs. The company was working with the banking community in an effort to increase the company's line of credit. The company was successful; however, the bankers were becoming increasingly nervous about Lockheed's financial plight. The line of credit was restructured to $500 million. Of this amount, only

$30 million additional was available to Lockheed. The remaining $150 million would be made available to the company after they had settled the military contract disputes with the government.

In March 1970, Lockheed concluded that they were overextended. Capital to support the military programs and the L-1011 would not be available for existing funds and projected income past the end of the year. In short, Lockheed was on the verge of bankruptcy. In a desperate attempt to raise funds, Lockheed turned to the Department of Defense. In a letter to Deputy Defense Secretary David Packard, Mr. Haughton requested $650 million in immediate funds, pending settlement of the military contracts.

Lockheed received a formal answer in the form of a letter from Mr. Packard to the Senate Armed Services Committee. (See Exhibit 7.) Relevant financial data for the Lockheed Aircraft Corporation is contained in Appendix A.

EXHIBIT 7

December 30, 1970

Mr. Dan Haughton
Chairman of the Board
Lockheed Aircraft Corporation
Burbank, California

Dear Mr. Haughton:

Attached ia a copy of my letter of 30 December 1970 to the Chairman of the Senate Armed Services Committee which outlines the plan of action which I have proposed to the Congress to resolve the contractual difficulties between the government and the Lockheed Aircraft Corporation. A similar letter has been forwarded to the Chairman of the House Armed Services Committee.

This plan, which I discussed by telephone with you recently, outlines the alternatives available for the C-5A program and proposes a course of action to settle the disputes on the Cheyenne program.

I would appreciate your comments on this plan and the alternative you prefer to resolve the C-5A controversy. You, of course, understand that our ultimate course of action is also dependent upon Congressional consideration.

Sincerely,

/s/ David Packard

Attachment

December 30, 1970

Honorable J. C. Stennis
Chairman, Senate Armed
Services Committee
United States Senate
Washington, D. C. 20510

Dear Mr. Chairman:

As you know, on March 2, 1970, Mr. Daniel Haughton, Chairman of the Board of Lockheed Aircraft Corporation, submitted a letter to the Department of Defense citing his company's contractual and financial problems on four major defense programs: Navy shipbuilding, the SRAM Missile Motor, the Cheyenne helicopter, and the C-5A. Mr. Haughton's letter asserted that the "unprecedented dollar magnitude" of the claims and disputes in which these programs were then involved would "make it financially impossible for Lockheed to complete performance of these programs if we must await the outcome of litigation before receiving further financing from the Department of Defense." Mr. Haughton emphasized the urgent need for a settlement, or for some viable alternative to our procedure of requiring a contractor to continue performance with its own financing during resolution of disputed matters.

Immediately upon receiving this letter, the Department of Defense undertook an intensive independent determination of the nature and magnitude of the managerial and financial problems presented by Mr. Haughton's letter. Each of the military departments undertook to negotiate settlements of their individual programs. My staff compiled and analyzed data relating to the total corporate entity, including corporate financial forecasts prepared by Lockheed at our request and audited by the Defense Contract Audit Agency. It was necessary to determine the financial viability of the corporation and to examine the availability of commercial credit to meet the company's obligations.

Of utmost importance was our need to assure the continued availability of weapons systems urgently needed for our national security. Several programs for which Lockheed Aircraft Corporation is a contractor with the Department of Defense are particularly critical to the nation's defense.

These include the Poseidon missile system, the S-3A aircraft, the Cheyenne helicopter, and the C-5A aircraft. In addition, it clearly is in the vital national defense interest that the Navy ships currently being built under contract with the corporation be continued to completion.

The time has now come when we must move promptly toward a settlement of Lockheed-DoD contract disputes at minimum cost to the U. S. Government and with minimum impact on third parties such as Lockheed employees, suppliers, subcontractors and their employees.

It is my responsibility as Deputy Secretary of Defense to seek and to find a solution. I have learned over the years that prolonged procrastination in the face of a difficult problem is an unsatisfactory stance that too often brings not solutions but added problems. Nothing is to be gained by wishing that these problems which arose in the past would go away; instead we must face present facts and move on to future needs. I therefore wish to present to you, as I promised to do, my plan to resolve these disputes.

To briefly recap, the defense contracts which have contributed to Lockheed's financial problem were executed before this administration took office. The C-5A contract was awarded to Lockheed in October 1965. The supplemental agreement to the contract, which committed funds for 23 additional aircraft and which is claimed by Lockheed to have exercised an option for 57 aircraft, was entered into during the last week of the previous administration. It is the principal dispute over the C-5A contract.

The contract for development of the AH-56A (Cheyenne) was awarded by the Army to Lockheed in March 1966. It contained an option for production quantities which was exercised in January 1968.

The contract for SRAM missile development was awarded to Boeing in November 1966, with Lockheed participating as the subcontractor for the rocket motor.

The nine Navy ship contracts out of which Lockheed's claims arose were awarded to Lockheed from 1961 through 1965.

Shortly after taking office in January 1969. Secretary Laird and I became aware of the difficulties being encountered on these programs. In fact, the problems we found in connection with these programs led to re-examination of and changes in the weapons acquisition process to bring both technical and cost problems under better control.

We re-evaluated operational requirements and looked at the C-5A cost growth in view of our budgetary constraints and decided not to extend that program beyond the 81 aircraft on order. Because of unresolved technical problems and a general failure to make progress, we made the decision to terminate the Cheyenne production contract for default. On the SRAM, we responded to technical and cost problems in development by not exercising our option for production and by continuing the emphasis on testing and development.

Since last March we have been working a virtually daily basis on resolution of these Lockheed claims and disputes. Numerous discussions also have been held with the banking community on future financing needs of the corporation.

Our review established that normal procedures for resolving these disputes would require an extended period of time for which Lockheed would have insufficient cash and inadequate commercial credit to finance the continued operation of vital defense programs. We also found that without the provision of additional funds by the Department of Defense and without continued bank support, bankruptcy of the Lockheed Corporation was and is inevitable. It was then necessary to determine whether bankruptcy and corporate reorganization under the Bankruptcy Act was or was not in the interest of national defense. We found that while such bankruptcy proceedings would, if instituted, primarily apply to Lockheed, that company's operations are so entwined with many other companies which also contribute to our national defense effort that it was necessary for us to consider the chain reaction upon other companies as well. Based on extensive discussions with bankers and other defense contractors, I have concluded that the consequences of Lockheed bankruptcy at this time would be so far-reaching that several other defense suppliers would be placed in such a precarious financial condition that their capability for future operations would be jeopardized. Further, several senior members of the banking community have advised me that bankruptcy of Lockheed now would cause them to reassess their credit agreements with many other companies which supply essential defense equipment.

The exact ramifications of a bankruptcy proceeding remain uncertain, but, in my judgment, the potential consequences are of such a grave nature that all reasonable steps should be taken to avoid precipitating a bankruptcy by our actions on defense programs. In the event of Lockheed's bankruptcy the Department of Defense would be faced with substantial uncertainties and risks about the degree to which several key national defense programs would or could be continued. Decisions on such matters would be subject to the discretion of the bankruptcy court, which would be required to take into consideration the interests of all creditors of the corporation. Serious delays would necessarily ensue. At a minimum, it is almost certain that an accommodation would have to be reached with the bankruptcy court to arrange to continue performance of the C-5A contract, amoung others, and I see no way which such an accommodation would enable the Department of Defense to obtain the C-5A and other needed equipment at a cost lower than under the course I am recommending.

With this background on the disputes and my judgment regarding bankruptcy, I want to provide the Committee my plan.

I want to make it quite clear in presenting this plan that, while we have had access to extensive financial data prepared by Lockheed and audited by the DCAA, we have only recently received Lockheed's current formal financial submittals. The plan I am proposing, therefore, is contingent upon Lockheed's being completely responsive to our continuing data requirements and our satisfactory analysis and audit of the data submitted.

I have concluded that our normal, established procedures are adequate to resolve two of the four issues.

On the SRAM, for which Lockheed is a subcontractor, the Air Force through its established procedures has negotiated a settlement with Boeing (the prime contractor). Twenty million dollars was paid in full settlement of the $54 million claim which Boeing submitted on behalf of Lockheed. This settlement specifically provided that the entire $20 million would be applied to increase the ceiling price of Lockheed's subcontract. This problem can therefore be considered resolved.

Ship claims of $46 million for work under five completed contracts were settled for $17.9 million in June of 1970. This settlement was reached through the established procedures for negotiating ship claims. The remaining claims, totaling $159.8 million, have been the subject of intensive negotiations between the Navy and Lockheed. To settle these claims, the Navy has offered Lockheed $58 million. I am hopeful that a settlement of these claims can be reached. Generally speaking, all negotiations regarding this program have also been concluded. The single remaining issue is Lockheed's acceptance of this offer.

The two remaining issues, therefore, are the Cheyenne program for the Army and the C-5A for the Air Force.

With regard to the Cheyenne program, it is my decision that it is in the best interest of the government to complete the development effort so that we can determine whether the Cheyenne will be a viable candidate to provide close air support for the Army, and so that we can realize some value for the investment we have already made. The ceiling price of the existing contract is approximately $95 million, of which about $90 million had already been disbursed by the Army. In an attempt to complete the development program, Lockheed has expended to date substantially more than the ceiling price and about $100 million more than it has been reimbursed. We believe that a realigned development program can be completed largely within the next year, but we have concluded that the company lacks the capacity to finance this program to a point of completion satisfactory for the Army to determine the aircraft system feasibility.

For this reason, we propose to convert the Cheyenne research and development contract to a cost reimbursement form effective as of December 29, 1969. The designation of the effective date is based upon an evaluation of all the relevant factors bearing on the program and upon analysis of Lockheed's overall financial condition, as shown by data received from Lockheed to date. Under this arrangement, the Army will assume future costs of the program and will reimburse Lockheed for approximately $25 million in costs which have been incurred on the development program since December 29, 1969.

The Cheyenne production "letter contract" which was executed by the Army in January 1968, and terminated for default in May 1969, is now in the early stages of litigation. Lockheed's costs for this phase of the program approximate $98 million against which they received $53.8

million from the Army in progress payments prior to default. Suppliers and subcontractors for the Cheyenne production program have submitted settlement proposals in excess of $84 million.

We have decided to settle the Cheyenne production contract by authorizing the Army to pay $36 million or the actual amount of the settlement of the claims of unpaid suppliers and subcontracts under this letter contract, whichever is lesser. The settlement agreement will include controls and audit procedures to assure that any funds actually paid will be used solely for this purpose. The Army will audit and monitor the settlement of the claims of suppliers and subcontractors before payment. Lockheed, pursuant to this settlement, will have to agree to withdraw from litigation their related claim now before the Armed Services Board of Contract Appeals.

On the C-5A program I have, after the most careful consideration of all relevant factors, narrowed the range for resolution to two alternatives.

1. One alternative is to reduce the number of peripheral issues in dispute by negotiation and to allow the core of the disagreements to proceed through litigation. The litigation would be basically concerned, therefore, with the question of whether the Air Force exercised an option for 81 airplanes or for 115 airplanes and the corresponding application of the repricing formula. The Air Force and Lockheed, over several weeks of discussion, have concluded that the litigable disagreements would result in a financial range from approximately a plus $25 million recovery by Lockheed against the United States to about $480 million liability or loss by Lockheed.

2. The other alternative would settle the entire dispute by eliminating all issues and imposing a fixed loss on Lockheed. In addition, such a settlement would preclude any performance incentive fees, or profits on initial spares and on added work related to the scope of the contract which Lockheed otherwise might have earned.

Our analysis of Lockheed's financial situation has led us to the conclusion that after the Air Force has paid Lockheed up to the Air Force's interpretation of ceiling price, the company will lack the funds or resources to finance continued production of the C-5A program. Moreover, under either alternative we must achieve a workable contractual arrangement which will permit the Air Force a more active role in management of the program. Also, under either alternative, it will be necessary for the Air Force to provide all the funds to complete the C-5A program. (Although, under the first alternative a portion may--and under the second alternative a portion would--be repayable to the Air Force.) In any event, stipulations under either alternative would include a repayment provision and interest charges on the unpaid balances, with an acccleration clause in the event of initiation of bankruptcy.

A fixed loss settlement alternative would remove once and for all the contentions of both parties. Such fixed settlement loss would consist

entirely of "allowable" costs, and would be above and in addition to losses due to certain costs incurred by the contractor which are neither allowed nor paid by the government. (These costs, referred to an "unallowables," are projected by Lockheed to exceed $40 million on this program. In addition, payments to Lockheed will exclude otherwise allowable costs to the extent such costs fall in the four numbered categories listed in Section 504(b) of the Department of Defense Procurement and Research Authorization Act, 1971 (P. L. 91-441).

In determining the dollar amount of the fixed loss that should be the basis for the settlement of the C-5A dispute, I took all relevant factors into consideration. Among the factors considered in arriving at this figure were the range of financial results which would result from the litigation, the apparent weight of the legal arguments of the parties on the issues in dispute and Lockheed's potential ability to respond to a judgment in favor of the United States, should one result. After weighing all the many complex factors, a $200 million figure represents my best judgment. I do not expect it to meet with unanimous endorsement; some will think it too low, others too high--but it remains my best judgment after months of consideration of what is without doubt the most complex management and contractual dispute I or any of the principals ever have encountered.

After weighing both of these alternatives I have concluded that the fixed loss settlement alternative is preferable. It has the advantage of finality, and would facilitate management improvements in the remainder of the program. I recognize the possibility that Lockheed may decline to settle for this fixed loss and prefer litigation.

As I mentioned earlier, Lockheed's latest financial information is being compiled and will be audited by the Defense Contract Audit Agency. We have also asked that the General Accounting Office review this data with us prior to the execution of our decisions.

The $200 million "contingency" fund, which we have requested to be authorized and appropriated for FY 1971 for the C-5A, will necessarily be utilized to continue the production of the aircraft beginning in February, and will be expended in the context of the settlement outlined above.

We are aware that the course of action which we propose to follow does not guarantee that bankruptcy of Lockheed is precluded; nevertheless, this course is, in our opinion, the necessary one based on the national defense interest. The uncertainty exists because overall financial stability of Lockheed is contingent not only on the financing of its defense programs, but also on further financial support from the private sector for its commercial programs, particularly the L-1011 airbus.

Our actions in settling the disputes on the four defense programs will resolve contingent liabilities of Lockheed and, we hope, thereby provide a degree of certainty to the overall financial affairs of Lockheed that will permit the banks to continue to finance the commercial programs, and avoid bankruptcy. I will continue to closely monitor the financial and management situation of Lockheed as these plans are implemented. It is also my intent to insure that all possible controls are exercised by Defense over our financial relationships with Lockheed to assure the satisfactory performance on Defense programs and the protection of Defense interests.

This summarizes the alternatives and the action we intend to take to resolve these very difficult contractual matters. The final details of the settlement and the documents necessary to implement this plan are now being prepared, and will be completed by the end of January 1971.

I will be available to review this plan in detail with your Committee at your convenience, and will be glad to have your views on the alternatives.

Sincerely,

/s/ David Packard

III. LOCKHEED AIRCRAFT CORPORATION: CAPITAL CASE

A. THE SITUATION

In 1966 Lockheed Aircraft Corporation was riding high in the aerospace industry. The company was in an exceptionally sound financial position. Net earnings for the year amounted to $59 million on sales of $2.1 billion. Stockholders' equity was $318 million and supported long term debt of only $17 million. This debt was in the form of 4 1/2 % debentures due in 1976. The company was providing $1.9 million per year for the retirement of these debentures. At this time, Lockheed was the nations's leading defense contractor. The previous year, the company had won a $1.9 billion contract to develop and produce the C-5A transport for the Air Force. If Lockheed could keep costs on the C-5A within contractual limits, it stood to gain before-tax profits of approximately $200 million in the next eight years.

By the end of 1972 Lockheed's financial position had changed drastically. Company operations for the period 1967 through 1972 had resulted in a net profit of only $11.6 million. During this time period Lockheed sustained pretax losses of $484 million on four major defense contracts. In 1971 the government passed the Emergency Loan Guarantee Act. Under this act, the government guaranteed loans of up to $250 million for Lockheed. These loans kept the company out of receivership. In 1972, long term debt for the corporation amounted to $761 million and the company was in need of additional capital.

B. LOCKHEED OPERATIONS, 1967-1969

In 1967, Lockheed dealt almost exclusively in defense contracting. During this period the company started to have financial difficulties with four major defense contracts. Three of these contracts, the C-5A Galaxy, the AH-56A Cheyenne helicopter and a motor for the Short Range Attack Missile (SRAM), had been awarded under a new concept known as "total package procurement" or TPP. The fourth contract was for Naval ship construction and was a fixed-price incentive type contract. Under TPP, the contractor submitted a fixed price for a total program through development and production. Each contract contained a ceiling price, which limited government liability to that amount. Any cost overruns in excess of the ceiling price were to be borne by the contractor. TPP projects were funded by progress payments from the government to the contractor as work progressed. The top limit for progress payments was normally set at 90% of the ceiling price.

Excessive cost overruns were encountered on all four programs. Prior to 1969, Lockheed had absorbed losses on these contracts of $140 million before taxes. In 1969 the company wrote off an additional $150 million on the programs, with a resultant net loss to the company of $32.6 million. In spite of these write-offs, Lockheed and the government were in disagreement over an additional $1 billion in cost overruns by the end of 1969.

In 1967 Lockheed management made the decision to diversify their operations. The new venture into the field of commercial aviation was the L-1011 TriStar. Since the company would not receive progress payments for the TriStar, as they were accustomed to under

defense contracts, new funding was necessary. In March 1967, a 4 1/4 % convertible subordinated debenture issue for $125 million was registered by Lockheed. Beginning in 1978, the company would be required to provide approximately $6 million annually for a sinking fund to retire these debentures if the total amount was still outstanding. Further financing was obtained from airline advance payments. By the end of 1969, Lockheed had firm orders for 102 L-1011s. Gross inventories on the program were $292 million of which $114 million represented advance payments. In 1968 and 1969 the company charged a total of $37.5 million of general and administrative L-1011 expenses to earnings as the aircraft moved into major assembly.

During 1969, the company began to feel the unpleasant effects of a cash shortage as capital was siphoned from the company to support the overrun defense contracts. To ease the strain, the company arranged with 24 banks for an unsecured line of credit for $400 million. All notes under this agreement were to mature in 1971 and bore interest at the prime commercial bank rate. At the end of 1971, Lockheed would have the option to obtain a loan of up to $400 million to be repaid in eight equal installments over a four year period. By the end of 1969, the company had drawn the line of credit down to $200 million.

C. LOCKHEED OPERATIONS, 1970 AND 1971

In early 1970, the Lockheed Aircraft Corporation could foresee a serious cash shortage. The $400 million line of credit, intended to finance the L-1011, had been drawn down to $80 million. Of the $320 million borrowed, $170 million had been diverted from the TriStar program to support the troubled defense contracts. The company

lacked adequate funding from current assets and projected income to fund either the L-1011 or the defense contracts. Lockheed was staring bankruptcy in the face. In a desperate attempt to obtain additional capital, Lockheed appealed to the Department of Defense for relief. The company requested $650 million in immediate funding, pending settlement of the disputed contracts. In late 1970, the SRAM contractual dispute was settled through negotiation. Lockheed accepted $20 million in lieu of its claim for $54 million that the company felt was necessary to complete SRAM development.

While awaiting an answer from the Department of Defense, the company turned again to the banking community. The $400 million line of credit was rearranged to provide a secured line for $500 million. This gave Lockheed only $30 million in immediate cash. The remaining $150 million was to be retained by the banks until such time as the government and Lockheed were able to resolve their differences.

On 27 January 1971, Lockheed received a final answer from the Defense Department in the form of an ultimatum. In his letter, Deputy Defense Secretary said in part:

> ...I have found that there is no precedent in the Department of Defense for advancing funds beyond those specified in a contract during the course of litigation between the contracting parties.... I have determined....the Department of Defense could not agree to payments to Lockheed in excess of the ceiling on the contract during the litigation or to restructure the existing contract.

In prior correspondence with Lockheed, Mr. Packard had offered the company $62 million in full settlement for outstanding ship construction claims of $160 million. He had also proposed to restructure the Cheyenne contract to a cost reimbursable contract,

contingent on Lockheed accepting a loss of $120 million on the program. In regards to the C-5A contract, Mr. Packard had offered Lockheed two alternatives. The first was to settle the dispute through litigation. Discussion between the Air Force and Lockheed indicated that the company would earn $25 million if all disputed points were settled in favor of Lockheed. If all issues were decided against Lockheed, the company would incur, in addition to previous losses on the program, a loss of $480 million. The second alternative would impose a fixed loss of $200 million on the company. Under either alternative, Mr. Packard had indicated that the government would continue to fund the program to completion.

Lockheed agreed with the proposed shipbuilding and Cheyenne settlements. Prior to receiving Mr. Packard's final letter, the company had intended to pursue the C-5A contractual dispute through the courts. Now, Lockheed was backed into a corner. With no additional bank financing available, the company would not be able to fund the C-5A program through a lengthy court battle. The company had no reasonable alternative but to accept the fixed loss. The company forfeited $100 million that it had already expended on the program. The remaining $100 million was to be repaid, with interest, in ten annual installments beginning in 1974. Lockheed wrote off all the losses, except the deferred $100 million, against 1970 earnings. This resulted in a net loss for the year of $86 million.

The following week, Lockheed was dealt another stunning blow. Rolls Royce, the contractor for the L-1011 engines, had been forced into receivership. The company had several alternatives for obtaining new engines. The most feasible of these was to negotiate

with the British government. In the end, Lockheed paid $260,000 more per engine, waived any penalty payments for late delivery, and accepted an engine with lower performance than originally specified. Although a new contract for the engines had been arranged, the fate of Lockheed was still in the hands of the government. The banks were refusing to advance the company additional funds without governmental guarantee of the loans.

This guarantee was in the form of legislation introduced before Congress in the spring of 1971. Known as the Emergency Loan Guarantee Act, it was to apply to all corporations having serious financial difficulties. Both critics and advocates of the bill realized that it was a way for the government to bail Lockheed out of trouble. After heated debate, the act was passed into law. In qualifying for the maximum $250 million loan guarantee, the company had provided Congress with 5 year projections on funds flow, income statements and balance sheets. These projections, shown in Exhibits 1 through 3, were intended to show how Lockheed could meet their financial obligations through 1975.

Throughout 1971, Lockheed had been working on a $750 million financial agreement. The new agreement consisted of $400 million already borrowed from 24 banks, $250 million guaranteed by the U. S. government and $100 million in additional prepayments from the airlines on L-1011 orders. The guaranteed loans were revolving nine-month notes bearing an interest rate 5/8 of a percent above the prime rate plus a guarantee fee of 2.3%. The non-guaranteed $400 million were ninety-day credit notes with an interest rate of

prime plus three quarters of a percent. The $100 million in prepayments also bore interest at the prime rate.

As 1971 came to an end, Lockheed had long term debt outstanding of $707 million. The gross TriStar inventories had risen to $1,027 million which included $286 million in airline advances. Charges against income for the year were $38 million for L-1011 general and administrative expenses and $42 million in disruption costs caused by the bankruptcy of Rolls Royce. Comparable general and administrative charges in 1970 were $42 million.

Sales for the year included $1.33 billion for military contracts which now allowed zero profit.

D. LOCKHEED OPERATIONS, 1972

During 1972 Lockheed delivered the first L-1011s. Only 17 aircraft were delivered instead of the scheduled 21, due to engine and production difficulties. These problems had been overcome but costs for the program were higher than anticipated. L-1011 sales amounted to $300 million. All TriStar deliveries were costed at an amount equal to revenues and provided no profit. Additional write-offs on the program totaled $80.5 million in 1972. Gross TriStar inventories stood at $1,389 million and included $330 million of normal advances and $100 million of interest bearing prepayments. In order to break even on the L-1011 program, the company needed to sell at least 300 TriStars. By the end of the year, orders had stagnated at 117 firm (including the 17 delivered) and 82 tentative. The future sales outlook for the airplane was not bright. Long term

debt for the company stood at an all time high of $760 million. A breakdown of this debt, extracted from the 1972 Lockheed annual report, has been reproduced in Exhibit 4.

E. LOCKHEED'S FUTURE?

Sales to the government during 1972 amounted to 75% of total sales. Due to increased TriStar sales, Lockheed predicted that this percentage would steadily decrease. (See Exhibit I.) Military sales of $250 million were carried at no profit in 1972. These profitless sales were estimated to be $120 million in 1973 and zero thereafter.

All L-1011 deliveries will be costed at amounts equal to revenues through 1975. The $100 million in interest bearing advances were scheduled to be liquidated through deliveries by 1976. Due to cost increases, general and administrative expenses for the TriStar program were revised by Lockheed to $70 million in 1973, $55 million in 1974 and $45 million in 1975.

Comparative financial reports and data for the Lockheed Aircraft Corporation from 1965 through 1972 are contained in Appendix A.

EXHIBIT 1

Consolidated Earnings: Financial Forecast
(in millions of dollars)

Year	1971	1972	1973	1974	1975
Sales:					
U. S. Government	2738	1825	1351	1513	1511
Foreign Governments	88	182	162	124	109
Commercial	151	576	984	1234	1484
Total	2977	2583	2497	2871	3104
Cost of Sales	2923	2508	2416	2776	2997
Operating Profit:					
U. S. Government	72	79	74	89	87
Foreign Governments	10	22	23	16	20
Commercial	(29)	(26)	(16)	(10)	0
Total	54	75	81	95	107
Other income (deductions)	(25)	(43)	(47)	(43)	(28)
Earnings before taxes	29	32	34	52	79
Tax Provision	14	16	16	25	38
Earnings	15	16	18	27	41

EXHIBIT 2

Balance Sheet: Financial Forecast
($ in millions)

Year	1971	1972	1973	1974	1975
Assets:					
Current Assets:					
Cash and securities	50	52	53	49	51
Accounts receivable-net	163	154	149	152	146
Inventories-net (note 1)	882	933	874	783	542
Prepaid expenses	28	33	36	34	30
Total	1123	1172	1112	1018	771
Fixed Assets (note 2)	343	317	303	293	285
Customer notes recv.	-	-	35	75	100
Other assets	4	4	7	9	11
Total Assets	1470	1493	1457	1395	1167
Liabilities and Stockholders' Equity:					
Current Liabilities					
Accounts payable	195	174	168	190	186
Income tax	-	-	-	-	10
Deferred income tax	45	60	75	100	90
Retirement plan	67	67	63	62	58
Salaries and wages	81	69	66	65	67
Other liabilities	63	52	55	60	60
Total current liabilities	451	422	427	477	470
Long-term borrowings	510	550	495	370	120
Notes payable-plant B-1	27	25	23	21	19
C-5A liability	100	100	100	90	80
Debentures	132	130	128	127	125
Stockholders' equity	250	266	284	310	352
Total	1470	1493	1457	1395	1167
Stockholders' equity:					
Capital stock	11	11	11	11	11
Additional capital	79	79	79	79	79
Retained earnings	159	176	194	220	262
Note 1:					
Progress payments	219	180	249	244	253
Commercial deposits	402	502	402	309	116
Note 2. Accumulated depreciation and amortization	378	433	477	523	568

EXHIBIT 3

Source and Disposition of Consolidated Working Capital: Financial Forecast
(in millions of dollars)

Year	1971	1972	1973	1974	1975
Source of capital:					
Earnings	14.9	16.3	17.6	27.1	41.1
Depreciation and amortization	61.1	55.9	51.4	48.3	47.7
Amortization of debenture expense	.1	.1	.1	.1	.1
Borrowing	160.0	65.0	-	-	-
Long term note-Plant B-1	27.0	-	-	-	-
Reduction in receivables	-	-	-	2.5	9.5
Book value of assets sold	3.6	.8	2.7	.6	.6
Total	266.7	138.1	71.8	78.6	99.0
Disposition of working capital:					
Fixed asset additions	62.5	31.4	39.1	39.9	39.9
Reduction in 4 1/4 % debentures	1.9	1.9	1.8	1.9	1.9
Reduction in borrowing	-	25.0	55.0	125.0	250.0
Reduction in note-Plant B-1	-	2.2	1.8	1.8	1.8
Reduction in C-5A facility	-	-	--	10.0	10.0
Increase in notes receivable	-	-	35.0	42.5	34.5
Increase (decrease) in other assets	(2.0)	1.1	2.7	2.2	2.0
Total	62.4	61.6	135.4	223.3	340.1
Increase (decrease) in working capital	204.3	76.5	(63.6)	(144.7)	(241.1)
Working capital at beginning of period	468.5	672.8	749.3	685.7	541.0
Working capital at end of period	672.8	749.3	685.7	541.0	299.9

EXHIBIT 4

1972 Long Term Debt

($ in thousands)

Notes payable to banks under the 1971 credit agreement	$400,000
Guaranteed notes	130,000
Deferred liability to the U. S. Government	100,000
4 1/2 % debentures-due in three equal installments	5,625
4 1/4 % debentures	125,000
	$760,625

The 1971 Credit Agreement provides for $400 million of revolving ninety-day credit notes and $250 million of revolving nine-month guaranteed notes. A guarantee fee is paid to the U. S. Government with respect to the guaranteed notes. Interest rates under the agreement fluctuate with specified market indicators (the prime rate and Treasury bills). At February 28, 1973, the effective interest cost, including the guarantee fee, was 7.36%.

Maximum permitted borrowings under the 1971 credit agreement are $650 million, decreasing to $630 million on June 30, 1973, to $595 million on December 31, 1973, and to $470 million on December 31, 1974. The Credit Agreement terminates on December 31, 1975.

Under the 1971 Credit Agreement, the capital stock of five of the company's consolidated subsidiaries and certain equipment are pledged as security for the notes and the company's 4 1/2 % debentures. The net assets of the pledged subsidiaries aggregate $214,272,000 at December 31, 1972, including property, plant and equipment having a depreciated cost of $176,359,000. Other pledged equipment had a depreciated cost of $34 million.

The deferred liability is payable commencing in 1974 in annual amounts which shall be the greater of $10 million or 10% of the preceding year's pretax income with interest accruing from January 1, 1974 at the prime commercial bank rate. The deferred liability is secured with a lien on property, plant and equipment at Marietta, Georgia, having a depreciated cost of $31,108,000 at December 31, 1972.

APPENDIX A

LOCKHEED FINANCIAL DATA

A. SELECTED FINANCIAL RATIOS

	1972	1971	1970	1969	1968	1967	1966	1965
Operating profit/total capitalization	.067	.054	(.171)	(.108)	.151	.206	.321	.346
Operating profit/stockholders' equity	.257	.209	(.596)	(.222)	.207	.288	.338	.367
Current assets/current liabilities	2.249	2.269	1,930	1.509	1.550	1.798	1.450	1.577
Quick assets/current liabilities	.436	.552	.514	.669	.853	.969	.615	.758
Pretax earnings/sales	.014*	.011**	(.063)	(.037)	.035	.044	.051	.057
Pretax earnings/stockholders' equity	.127*	.131**	(.681)	(.239)	.211	.284	.338	.368
After tax earnings/sales	.007*	.005**	(.034)	(.016)	.020	.023	.028	.030
After tax earnings/stockholders' equity	.061*	.062**	(.367)	(.102)	.120	.156	.185	.191
Long term debt/stockholders' equity	2.855	2.828	2.489	1.048	.373	.400	.053	.061
Sales/total assets	1.515	1.939	1.917	1.632	2.366	2.651	2.867	2.861
Stockholders' equity/total capitalization	.259	.261	.287	.489	.729	.714	.949	.943
Long term debt/total capitalization	.741	.739	.713	.512	.271	.286	.051	.057
Funds flow/total debt	.076	.150	.143	.082	(.102)	.232	(.033)	.071

Note: Total capitalization = long term debt + stockholders equity.

* Includes $3.2 million ($6.1 million before tax) on sale of land.
** Includes $3.8 million ($7.3 million before tax) on sale of land.

B. COMPARATIVE INCOME STATEMENTS
(dollars in millions except earnings per share)

	1972	1971	1970	1969	1968	1967	1966	1965
Net sales	2,472.7	2,852.4	2,535.6	2,074.6	2,217.4	2,335.5	2,084.8	1,814.1
Cost of sales	2,404.2	2,800.2	2,675.7	2,145.9	2,140.6	2,026.2	1,810.0	1,553.4
R&D cost						63.5	35.8	47.8
Administrative and general expense						144.9	131.6	115.3
Net Earnings	68.5	52.2	(140.1)	(71.3)	76.8	100.9	107.4	97.6
Other income	6.7	6.4	12.4	7.6	8.4	5.3	2.4	1.8
Total income	75.2	58.6	(127.7)	(63.7)	85.2	106.2	109.8	99.4
Interest	47.5	33.3	32.3	13.2	6.7	6.8	2.5	1.5
Deferred federal income tax	14.7	13.7	cr73.7	70.1	52.5			
Federal income tax				cr114.3	cr18.7	45.1	48.4	47.4
Net income	13.0	11.6	(86.3)	(32.6)	44.5	54.4	58.9	52.7
Sales of assets	3.2	3.8						
Balance to retained earnings	16.2	15.4	(86.3)	(32.6)	44.5	54.4	58.9	52.7
Retained earnings beginning of year	159.8	144.4	230.7	282.4	262.7	233.0	195.4	194.7
Cash dividends				19.1	24.7	24.6	24.5	22.0
Prior year adjustments							cr3.1	
Retained earnings end of year	176.0	159.8	144.4	230.7	282.4	262.7	233.0	195.4
Earnings per share	$1.15	$1.02	($7.60)	($2.90)	$3.96	$4.84	$5.27	$4.87
Depreciation	47.8	54.6	56.4	43.9	38.1	31.0	25.4	21.2

C. COMPARATIVE BALANCE SHEETS
(dollars in millions)

	1972	1971	1970	1969	1968	1967	1966	1965
Cash	89.0	82.5	40.2	52.1	27.7	30.8	25.2	32.6
Short term commercial paper		19.3	39.3		78.9	60.9		10.0
Receivables net	174.9	181.5	179.1	244.8	236.6	264.2	206.5	192.1
Anticipated refund of Federal Taxes				114.3	21.8			
Inventories net	1,065.2	851.4	693.9	500.4	285.7	274.7	285.5	246.3
Prepaid expenses	31.5	30.4	19.4	15.3	12.5	29.6	29.6	14.0
Total current assets	1,361.2	1,165.1	971.9	926.9	663.2	660.3	546.8	495.0
Investment in affiliates	1.4	1.5	4.2	4.3	4.5	5.1	4.8	4.3
Property plant and equipment	661.6	660.5	662.9	608.8	500.7	419.2	355.6	288.4
Depreciation and amortization	(393.8)	(360.9)	(319.5)	(271.0)	(234.2)	(205.7)	(180.5)	(159.0)
Net property account	267.8	299.6	343.4	337.8	266.5	213.5	175.1	129.4
Other deferred charges	1.8	5.1	3.1	2.4	2.6	2.1	.3	.7
Total assets	1,732.2	1,471.2	1,332.6	1,271.4	936.8	881.0	727.0	629.4

C. COMPARATIVE BALANCE SHEETS (continued)
(dollars in millions)

	1972	1971	1970	1969	1968	1967	1966	1965
Notes payable------							30.0	
Accounts payable---	229.2	187.5	244.8	278.5	159.8	164.4	133.8	123.5
Accrued federal taxes	65.7	49.9	33.1	108.5	19.4	13.7	39.9	30.2
Accrued liabilities--	245.7	229.1	196.4	212.8	209.6	162.1	150.7	126.2
Advances and deposits on contracts------	65.5	47.1	29.2	14.4	39.2	27.0	22.6	34.9
Total current liabilities--------	606.1	513.6	503.5	614.2	428.0	367.2	377.0	314.8
Debentures, 4 1/2 % due 1976--------	5.6	7.5	9.4	11.3	13.1	15.0	16.9	18.8
Convertible debentures, 4 1/4 % due 1992---	125.0	125.0	125.0	125.0	125.0	125.0		
Deferred liability, U. S. Government	100.0	100.0	100.0					
Notes payable to banks	530.0	475.0	350.0	200.0				
Deferred income-----						24.0	15.5	20.2
Long term debt--	760.6	707.5	584.4	363.3	138.1	164.0	32.4	20.2
Capital stock, $1 par	11.4	11.4	11.4	11.4	11.3	11.2	11.2	11.1
Paid-in surplus----	79.0	79.0	79.0	79.0	77.0	75.9	73.4	71.0
Retained earnings--	176.0	159.8	144.3	230.7	282.4	262.7	233.0	195.4
Stockholders' equity	266.4	250.2	234.7	320.9	370.7	349.8	317.6	277.5
Total liabilities--	1,632.2	1,471.2	1,332.6	1,271.4	936.8	881.0	727.0	629.4

D. FUNDS FLOW (in millions of dollars)

	1972	1971	1970	1969	1968	1967	1966	1965
Sources:								
Net income-------	16.2	15.4	(86.3)	(32.6)	44.5	54.4	58.9	53.7
Depreciation-----	47.8	54.6	56.4	43.9	38.1	31.0	25.4	21.2
Decrease in deferred income---------	---	----	----	----	(24.0)	----	(4.7)	----
Decrease in deferred charges---------	----	----	----	.2	----	----	----	----
Net from operations	64.0	70.0	(29.9)	11.5	58.6	85.4	79.6	74.9
Sales of stock----	----	----	----	.2	1.2	2.5	2.5	6.7
Long-term borrowing*	55.0	125.0	250.0	200.0	----	133.5	----	----
Acquired subsidiary	----	----	----	1.7	----	----	----	----
Sale of investments	----	----	.1	.2	.7	----	----	----
Other charges----	5.8	9.7	1.5	3.9	2.2	.4	.6	.4
	124.8	204.7	221.7	217.5	62.7	221.8	82.5	82.0
Dispositions:								
Capital expenditures	21.8	17.7	63.5	119.0	93.2	69.8	71.4	35.9
Dividends-------	----	----	----	19.1	24.7	24.6	24.5	22.0
Long-term debt retired-------	1.9	1.9	1.9	1.9	1.9	1.9	----	----
Investments-----	----	----	----	----	----	.4	.5	----
Increase/decrease in deferred charges	(3.3)	2.0	.7	----	.5	1.8	----	.3
Increase/decrease in working capital	104.4	183.1	155.6	77.5	(57.6)	123.3	(13.9)	23.8

* Includes increase in deferred income in 1965 & 1967. Deferred liability in 1970.

BIBLIOGRAPHY

1. "AH-56A Set to Move Into Production Phase," Aviation Week & Space Technology, v. 88, p. 40-41, 15 January 1968.

2. "Air Force Held Facing 100% Overrun on C-5A Contract Cost," Aviation Week & Space Technology, v. 89, p. 20, 18 November 1968.

3. Brownlow, Cecil, "Lockheed Plans Litigation, Rejects Fixed C-5A Loss," Aviation Week & Space Technology, v. 94, p. 17-18, 11 January 1971.

4. "Can Lockheed Pilots Avoid the Crash," Business Week, p. 23-25, 14 March 1970.

5. Lockheed Aircraft Corporation, Facts and Figures for Financial Analysis, July 1973.

6. Lockheed Aircraft Corporation, Lockheed Annual Report, 1969.

7. Lockheed Aircraft Corporation, Lockheed Annual Report, 1970.

8. Lockheed Aircraft Corporation, Lockheed Annual Report, 1971.

9. Lockheed Aircraft Corporation, Lockheed Annual Report, 1972.

10. Lockheed Aircraft Corporation, Statements Before the Committee on Armed Services United States House of Representatives, 17 June 1969.

11. "Lockheed's Ledger on the C-5A," Business Week, p. 35-36, 7 June 1969.

12. Mecklin, John, "The C-5A: The Ordeal of the Plane Makers," Fortune, p. 158-159, 280, 282, 284, 288, 290, 292, December 1965.

13. Meyers, Harold B., "For Lockheed, Everythings Coming Up Unk-Unks," Fortune, p. 77-81, 131-134, 1 August 1969.

14. Moody's Investors Service Inc., Moody's Industrial Manual, v. 2, p. 696-698, 1967

15. Moody's Investors Service Inc., Moody's Industrial Manual, v. 2, p. 2852-2853, 1973.

16. Newman, Barbra, "The Care and Feeding of Lockheed," The New Republic, p. 11-13, 10 October 1970.

17. Phillips, James G., "What Really Happened? The Lockheed Scandal," The New Republic, p. 19-23, 1 August 1970.

18. Winston, Donald C., "Overruns on C-5A Costs Face Intensified Scrutiny," Aviation Week & Space Technology, v. 90, p. 26, 26 May 1969.

INITIAL DISTRIBUTION LIST

	No. Copies
1. Defense Documentation Center Cameron Station Alexandria, Virginia 22314	2
2. Library, Code 0212 Naval Postgraduate School Monterey, California 93940	2
3. Professor Leslie Darbyshire Department of Operations Research and Administrative Science Naval Postgraduate School Monterey, California 93940	1
4. LCDR Kent "A" Link FAW-2 FPO San Francisco, California 96601	1
5. Department Chairman, Code 55 Department of Operations Research and Administrative Sciences Naval Postgraduate School Monterey, California 93940	1